

REPLENISHMENT OF CRUSTACEAN ASSOCIATES OF CORAL ISOLATES IN THE CENTRAL REGION OF THE GREAT BARRIER REEF

Most coral reef habitats support a rich fauna of crustacean associates (Bruce, 1976). These associations range from the use of corals as one of a range of habitats (Coles, 1980) through to obligate species feeding on coral mucus (Knudsen, 1967). Although previous ecological studies have revealed local and regional variations in species composition and abundance of coral dwelling crustaceans (Abele, 1976) there have been few attempts to quantify distributions, abundances and species replenishment systematically at any scale.

The present study was a four year survey of the crustacean fauna associated with live and dead *Pocillopora verrucosa*. The crustaceans were sampled systematically from isolated corals placed at coral reefs located on a transect spanning the width of the continental shelf in the central region of the Great Barrier Reef. The location of the reefs and the sampling methods used are described in detail in Preston and Doherty (1990).

The results of this study demonstrated pronounced cross-shelf patterns in the species composition and abundance of crustaceans that colonised cleared corals. These patterns persisted throughout the four year study.

Among the microcrustaceans copepods were the dominant taxa found on live and dead corals in the mid-shelf and outer shelf reefs. Tanaids and cumaceans were more dominant on the inner shelf reef particularly on back reef sites. The total abundance of microcrustaceans was significantly greater on the mid-shelf than on the inner or outer shelf.

Live and dead corals from the mid-shelf reefs yielded significantly greater numbers of agile shrimps than those located at the inner or outer shelf reefs. On all reefs the shrimp fauna on live corals was dominated by a single species; *Periclimenes amymone*. However, monthly comparisons of community structure and faunal similarity revealed regional variation in species replenishment following disturbance of live corals. By contrast, the agile shrimp associates of dead corals showed a more even distribution of individuals among species and a more regular pattern of regional species replenishment.

Destructive sampling at the end of the survey revealed that live corals on all reefs supported a common group of sedentary macrofaunal associates. However, there were significantly fewer of these associates on the inner shelf reef. On dead corals there were similar numbers of sedentary macrofaunal associates at all locations but pronounced cross-shelf patterns in species composition.

The results of this study suggest that the amount of space available is not necessarily a limiting resource for crustaceans that have formed an association with living corals. Nor is it the case for free-living species that inhabit dead corals. Consistently lower yields of agile shrimps and microcrustaceans from standard sized units of live and dead corals at the inner and outer shelf reefs compared with the mid-shelf reefs indicate that the former sustain relatively depauperate populations of these crustacean associates. Relatively low rates of replenishment by recruitment or migration apparently maintain this cross-shelf pattern.

Regional variation in replenishment of live corals by obligate species probably reflects the regional population density of the host corals. In order to establish if a similar link exists between the distribution and abundance of free-living species and concurrent patterns of particular habitats we need to know more about the connection between these species and their habitats.

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N.P. Preston, CSIRO Marine Laboratories, Cleveland, Queensland 4163, Australia.